NextGen Weather Data Cube

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NextGen 4-D Weather Data Cube

NextGen is a Congressionally mandated initiative to modernize the U.S Air Transportation System in order to:

- Increase capacity and reliability
- Improve safety and security
- Minimize the environmental impact of aviation

NextGen 4-D Weather Data Cube

The Virtual NextGen Data Cube will contain:

- Continuously updated weather observations (surface to low earth orbit, including space weather and ocean parameters)
- High resolution (space and time) analysis and forecast information (conventional weather parameters from numerical models)
- Aviation impact parameters for IOC (2013)
    - Turbulence
    - Icing
    - Convection
    - Ceiling and visibility
    - Winds (surface and aloft)
- The Data Cube of the future will contain “all” weather data, not just aviation parameters

NextGen Weather Data Cube Fundamental Concepts

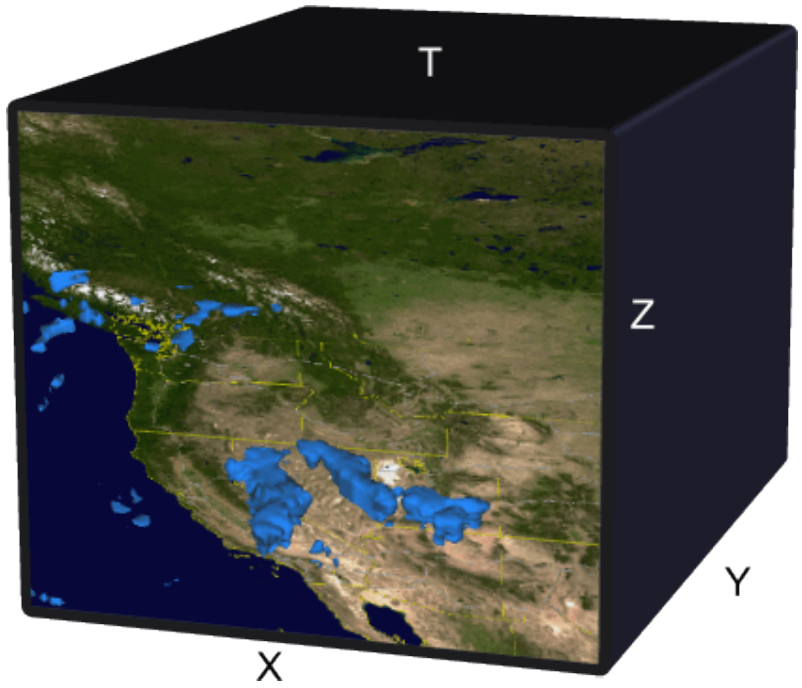
- An integrated and nationally consistent common weather picture for observation, analysis, and forecast data available to all system users
- "Network Enabled" - available, secured, real-time, useful information
- "Virtual" repository with no single physical database or computer
- Conceptually unified source distributed among multiple physical locations and suppliers, of which NOAA is the primary data supplier
- Direct integration of weather information into operational decision making processes

NextGen 4-D Weather Data Cube

• X, Y, Z + time (3-dimensional data products over time)

• **Network Enable**
  - •An information network that makes information available, secure, and usable in real-time

• **Universal Access**
  - •Implies standardized access mechanisms and distributed suppliers



NextGen 4-D Weather Data Cube Standards

Service Standards:

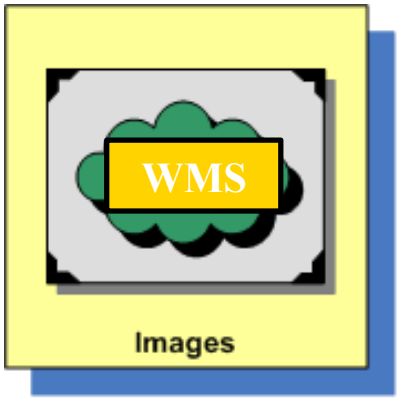
- Open Geospatial Consortium (OGC) Standards
  - Web Coverage Service (WCS) – gridded data
  - Web Feature Service (WFS) – non-gridded data
  - Web Map Service (WMS) – image data
- OASIS (Organization for the Advancement of Structured Information Standards) ebRIM – metadata

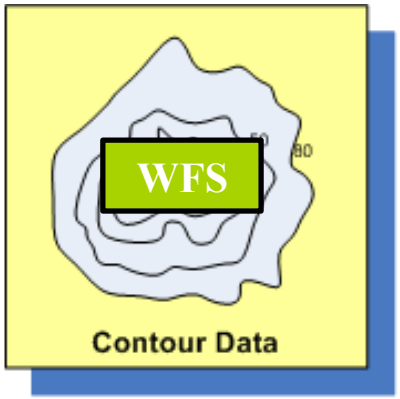
NextGen 4-D Weather Data Cube Standards

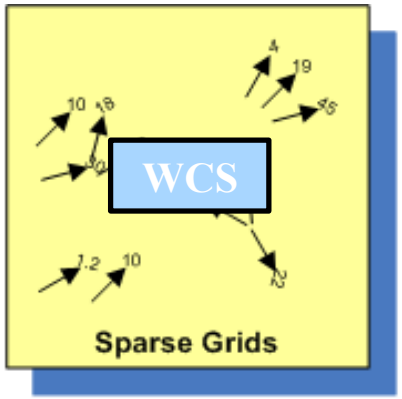
Data Formats:

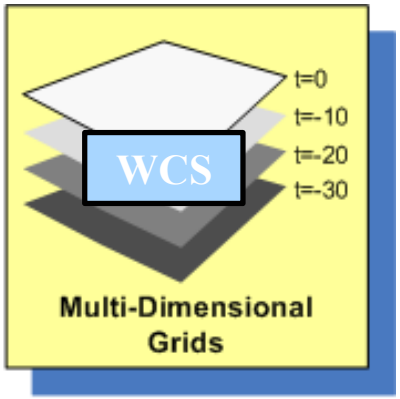
- Gridded Data
  - NetCDF-CF 4
  - GRIB-2
- Non-gridded
  - WXXM (Weather Exchange Model)
  - OGC GML (Geography Markup Language) compliant
- Metadata
  - ISO 19115, 19139

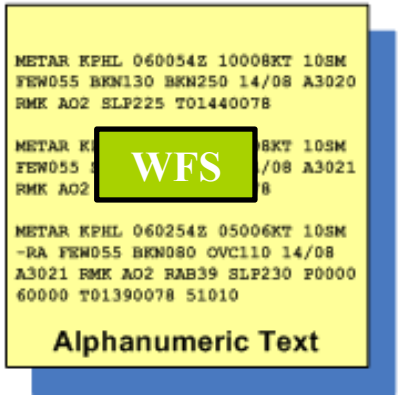
Common Weather Data Types and Service Mapping

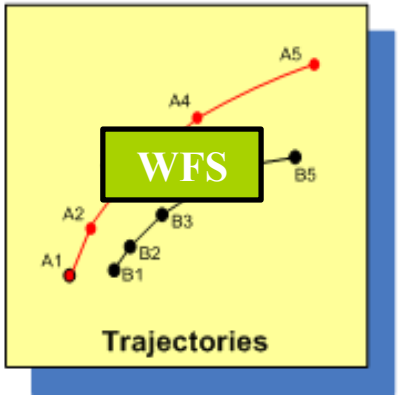


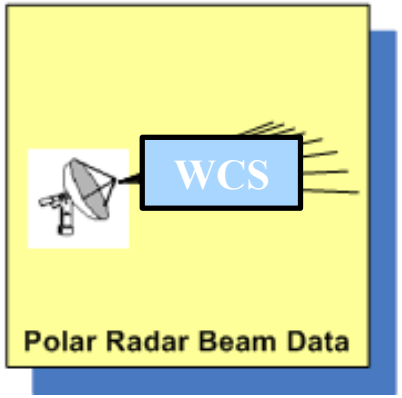


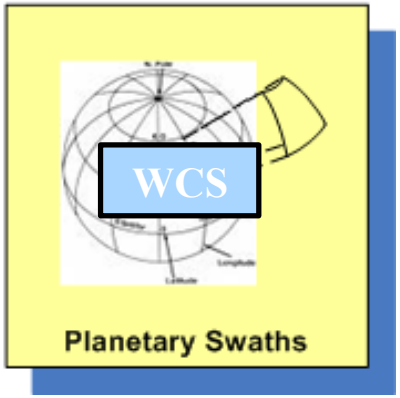






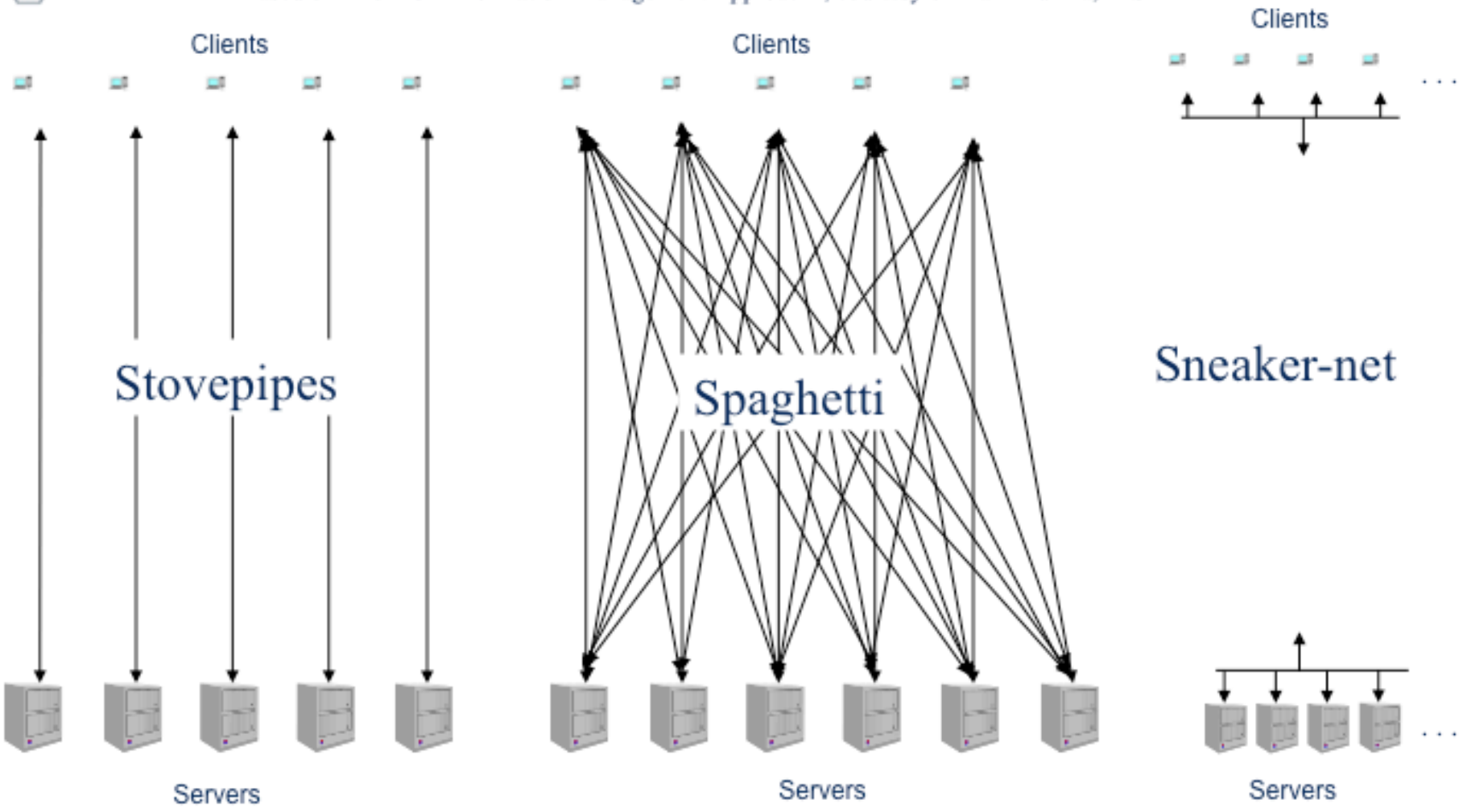




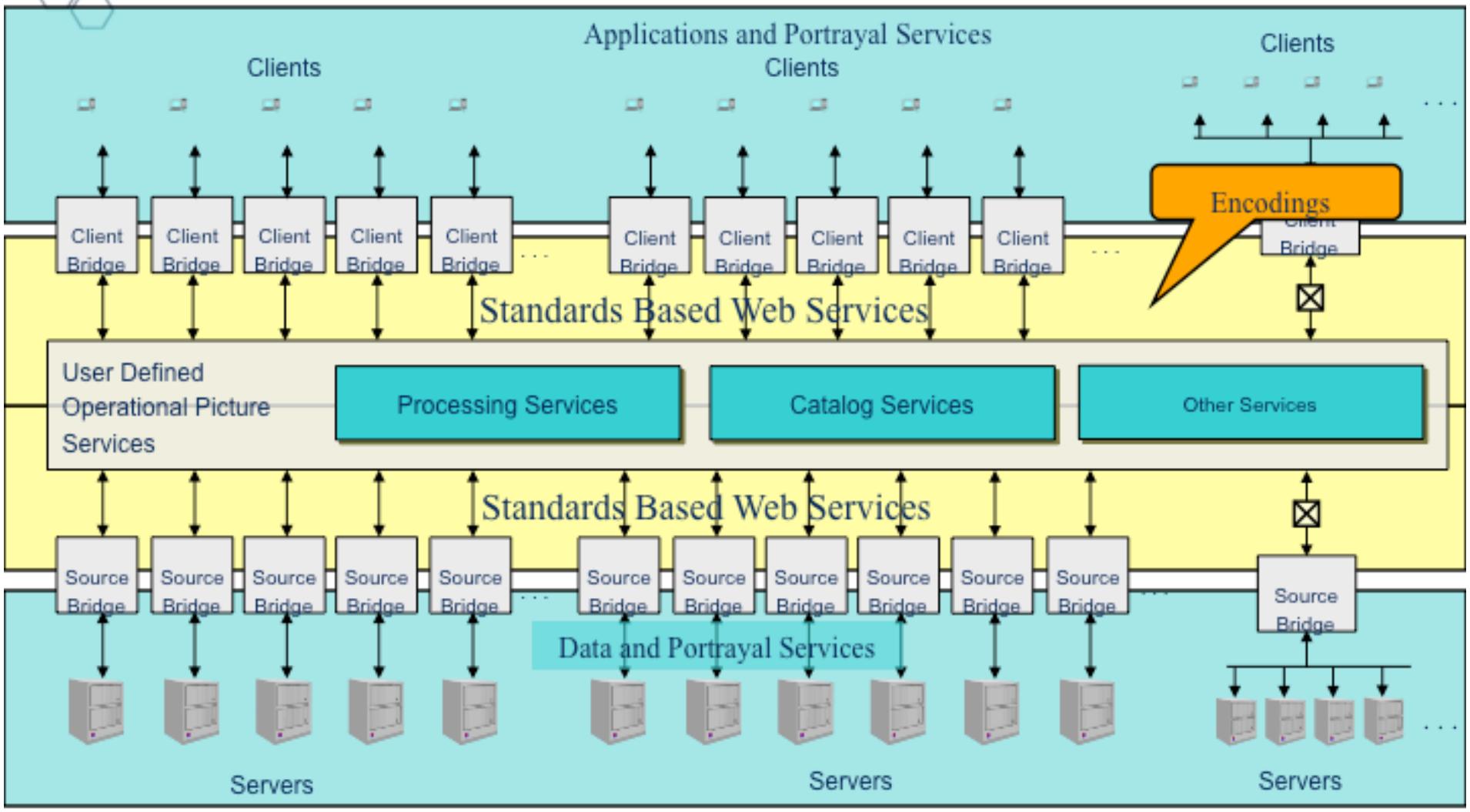


Goal: Helping to Change This…

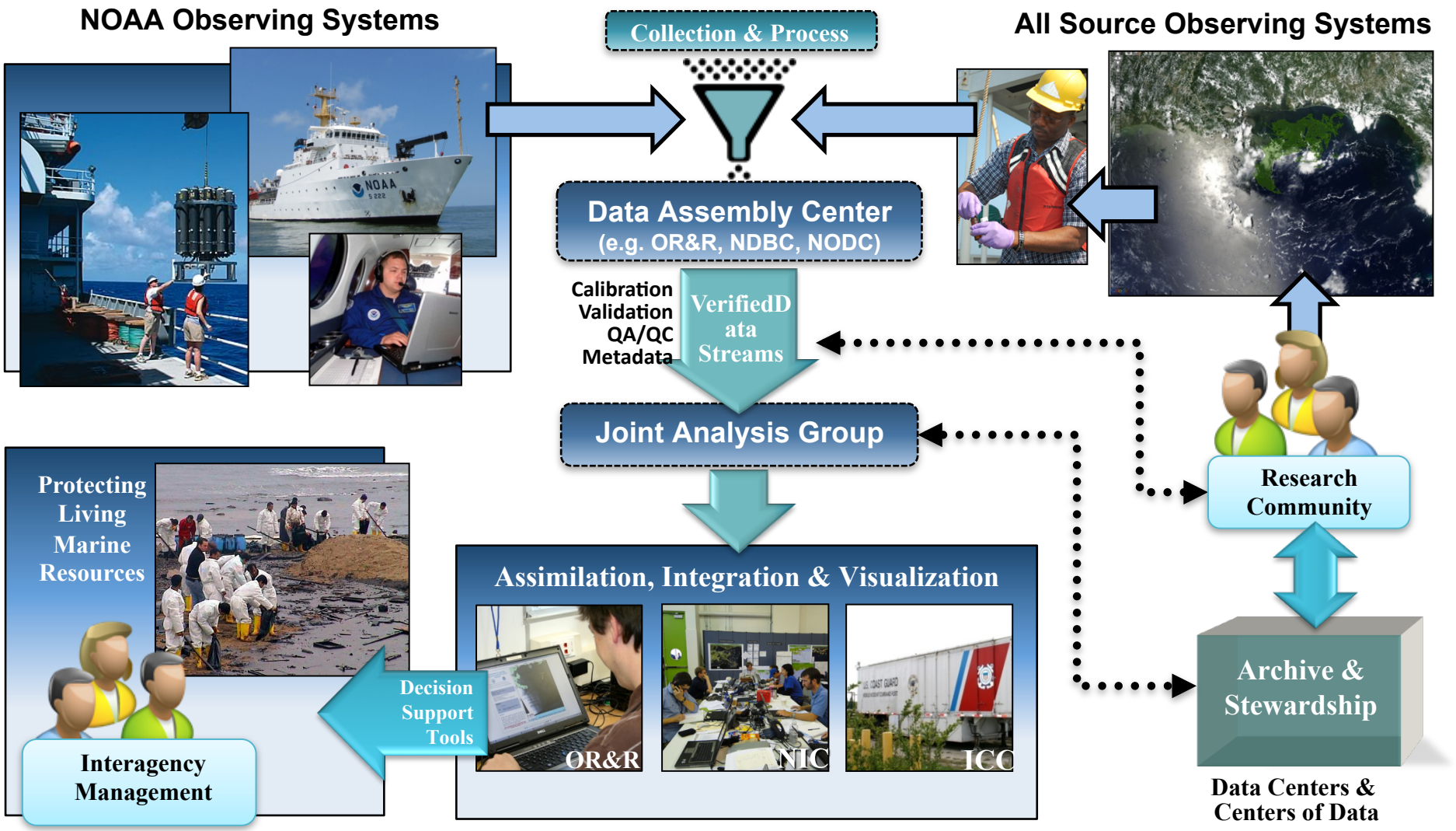
*Based on "DoD C2 Information Management Approach", courtesy of Mark Kuzma, DISA



To This… Standards-based Services and Encodings



Integrating Data Access to Address an Ecological Disaster



Deepwater Horizon

http://www.noaa.gov/sciencemissions/bpoilspill.html

GeoPlatform.gov is a one-stop shop for detailed near-real-time information and data about the response to the Deepwater Horizon/ BP oil spill.

NOAA's response has been immediate and sustained, strategic and scientific.

From day one, NOAA has been tracking every aspect of this spill: where the oil is going on the surface and under the sea, and what the consequences are to coastal communities, wildlife and the marine environment. We are bringing all scientific methods to this task:

* Satellites in space
* Planes in the air
* Boats on the water
* Gliders below the surface
* Scientists on the ground

NextGen 4-D Weather Data Cube Status

Capability Evaluation (CE) at the William J. Hughes Technical Center (WJHTC) September, 2010

- **Participants:**
  - Meteorological Development Laboratory (MDL)
  - Global Science Division (GSD)
  - Aviation Weather Center (AWC)
  - National Severe Storms Laboratory (NSSL)
  - National Center for Atmospheric Research (NCAR)
  - Massachusetts Institute of Technology / Lincoln Laboratory (MIT/LL)
  - WJHTC – Radar and Mosaic Processor (RAMP)
  - WJHTC – Regional Automated Weather Observing System Data Acquisition Service Provider (RASP)

NextGen 4-D Weather Data Cube Status Cont.

- Continued Capability Evaluations
- Integration and testing with LAPS
- Integration and testing with AWIPS II
- IOC 2013 (should be available to the private sector on or before this date)
- FOC 2023

Questions?

CROSS ORGANIZATIONAL NOTIONAL ARCHITECTURE